



**STATEMENT OF BASIS**  
**Page 1 of 7**  
BAQ Air Permitting Division

<b>Company Name:</b> Santee Cooper Berkeley County Landfill Gas to Energy Facility	<b>Permit Writer:</b> Kathleen Haddock, PE
<b>Permit Number:</b> TV-0420-0112	<b>Date:</b> <b>DRAFT</b>

**DATE APPLICATION RECEIVED:** September 15, 2017

**DATE OF LAST INSPECTION:** August 10, 2016 – No violations

**FACILITY DESCRIPTION:** The facility owns and operates a Landfill Gas-to-Energy power plant that consists of two (2) internal combustion engines. The equipment is located on-site at the Berkeley County Landfill. The engines combust landfill gas produced by decaying material at the landfill. Each engine can generate 1,600 kW of electricity at maximum capacity.

Landfill gas is collected by a gas collection/blower system operated by Berkeley County and delivered to the on-site generation facility. The landfill gas is pre-treated through one system for both engines. The system is equipped with a mini-flare to combust methane gas used to regenerate the carbon filter in place for the removal of silohexane.

Note that the landfill operates an additional flare for combusting excess gas not used for electricity generation. As this is not owned or operated by Santee Cooper it is not included in the permit.

**PROJECT DESCRIPTION:** This project is for the renewal of the facility's Title V operating permit.

**COLLOCATION DETERMINATION:** Based on information provided during the review period for the initial Title V permit, the gas-to-energy facility is not considered to be collocated with the Berkeley County Landfill. A similar decision had been previously made between Santee Cooper and the Anderson County Landfill. Information provided by the facility, and confirmed in an email dated July 17, 2012, states that the "contractual arrangement shows that either facility may terminate the relationship at will without significant penalty to either one."

The adjacent landfill is not currently triggering NSPS Subpart Cc control device requirement or MACT Subpart AAAA. When the requirements are triggered, this facility's gas pre-treatment system may be considered a compliance device for the landfill; see discussion below.

**SOURCE TEST REQUIREMENTS:** In accordance with §60.4243(b)(2)(ii), after an initial compliance test (approved by the Department on November 1, 2010), the facility is required to conduct performance testing every 8,760 hours or three years, whichever comes first, to demonstrate compliance with the NO<sub>x</sub>, CO, and VOC limits listed in Table 1 of the subpart.

**OTHER: (For information only)** In accordance with §60.32c(a), the Berkeley County Landfill is subject to 40 CFR 60, Subpart Cc – Municipal Solid Waste Landfill as it was built before 1991. In accordance with §60.36c(a), the landfill is not required to install a control device until emissions exceed 50 megagrams per year. If this occurs, the Santee Cooper combustion engines could be used as a control device for the landfill. (See ADI#0600066). The landfill is currently not subject to 40 CFR 63, Subpart AAAA - Municipal Solid Waste Landfills, but will become subject when NMOC emissions exceed 50 megagrams. Compliance with 40 CFR 63 Subpart AAAA can be demonstrated by compliance with 40 CFR60 Subpart Cc.

Note: NSPS Subpart WWW will be triggered if the facility reconstructs or modifies the landfill, as defined in the subpart.



**STATEMENT OF BASIS**  
**Page 2 of 7**  
 BAQ Air Permitting Division

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The following condition was developed between the Department and the facility to address the occurrence described above (email C. Hardee, BAQ to D. Ciccolella, Santee Cooper, November 1, 2012):

“At such time that the adjacent landfill becomes subject to 40 CFR 60 Subpart Cc - Municipal Solid Waste Landfills and 40 CFR 63 Subpart AAAAA - Municipal Solid Waste Landfills, the gas pre-treatment system has the potential to be used as a control system for compliance. Should the gas pre-treatment system be chosen as a control system for compliance with these regulations, the owner/operator shall comply with all applicable requirements for landfill gas that is accepted by the owner/operator for use in equipment that it owns and operates. The adjacent landfill will be responsible for compliance with all applicable requirements for all other landfill gas generated.”

<b>Table 1: Facility-wide Emissions</b>		
<b>Pollutant</b>	<b>Uncontrolled</b>	
	<b>lb/hr</b>	<b>TPY</b>
PM	0.47	2.08
PM <sub>10</sub>	0.47	2.08
PM <sub>2.5</sub>	0.47	2.08
SO <sub>2</sub>	0.073	0.32
NO <sub>x</sub>	5.24	22.96
CO	41.46	181.61
VOC	8.66	37.95
CO <sub>2e</sub>	7916.29	34673.34
1,1,2,2-Tetrachloroethane	1.64E-03	7.19E-03
1,1,1-Trichloroethane	9.21E-04	4.03E-03
1,1,2-Trichloroethane	1.28E-03	5.61E-03
1,2,4-Trichlorobenzene	3.68E-06	1.61E-05
1,3-Butadiene	1.07E-02	4.68E-02
1,3-Dichloropropene	1.06E-03	4.63E-03
1,4-Dichlorobenzene	5.23E-04	2.29E-03
1,4-Dioxane	9.75E-04	4.27E-03
2,2,4-Trimethylpentane	1.00E-02	4.39E-02
Acetaldehyde	3.35E-01	1.47
Acetonitrile	1.12E-03	4.89E-03
Acrolein	2.06E-01	9.04E-01
Acrylonitrile	2.06E-02	9.02E-02
Benzene	1.38E-02	6.03E-02
Benzyl Chloride	9.50E-06	4.16E-05
Biphenyl	8.48E-03	3.71E-02
Bromoform	1.30E-05	5.69E-05
Carbon Disulfide	1.83E-04	8.02E-04
Carbon Tetrachloride	7.33E-04	3.21E-03
Carbonyl Sulfide	1.22E-04	5.35E-04

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**Table 1: Facility-wide Emissions**

Pollutant	Uncontrolled	
	lb/hr	TPY
Chlorobenzene	1.57E-03	6.89E-03
Chloroform	6.66E-04	2.92E-03
Cumene	2.14E-04	9.39E-04
Ethanethiol	5.88E-04	2.57E-03
Ethyl Benzene	2.14E-03	9.37E-03
Ethyl Chloride	1.06E-03	4.63E-03
Ethylene Dibromide	1.10E-03	4.80E-03
Ethylene Dichloride	3.74E-04	1.64E-03
Ethylidene Dichloride	9.65E-04	4.22E-03
Formaldehyde	2.63E-01	1.15
HCl	6.16E-02	2.70E-01
Hexane	4.47E-02	1.96E-01
Hexachlorobutadiene	3.77E-06	1.65E-05
Hydrogen Sulfide	5.02E-03	2.20E-02
Mercury	2.43E-07	1.06E-06
Methanol	1.00E-01	4.38E-01
Methyl Bromide	8.27E-06	3.62E-05
Methyl Chloride	5.11E-05	2.24E-04
Methyl Chloroform	5.08E-04	2.22E-03
Methyl Ethyl Ketone (TAP, VOC only)	2.12E-03	9.29E-03
Methyl Isobutyl Ketone	7.77E-04	3.40E-03
Methyl Mercaptan	4.97E-04	2.18E-03
Methylene Chloride	1.50E-02	6.57E-02
Methyl Tert-Butyl Ether	4.31E-05	1.89E-04
Naphthalene	1.61E-03	7.05E-03
Phenol	9.60E-04	4.20E-03
Propylene Dichloride	8.44E-05	3.69E-04
Styrene	9.64E-04	4.22E-03
Toluene	4.43E-02	1.94E-01
Trichloroethylene	8.53E-04	3.74E-03
Vinyl Acetate	8.86E-05	3.88E-04
Vinyl Chloride	6.00E-04	2.63E-03
Vinylidene Chloride	8.04E-05	3.52E-04
Xylene (m,p)	1.02E-02	4.46E-02
Total HAPs:	1.17	5.15



**STATEMENT OF BASIS**  
**Page 4 of 7**  
 BAQ Air Permitting Division

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**OPERATING PERMIT STATUS**

This facility operates under a Title V Operating Permit issued on January 24, 2013 with an effective date of April 1, 2013. The permit will expire on March 31, 2018. The facility submitted an application for renewal on September 15, 2017. In accordance with SC Regulation 61-62.70.5 (a)(1)(iii), the facility is granted an application shield.

**Table 2: REGULATORY APPLICABILITY REVIEW**

Regulations	Comments/Periodic Monitoring Requirements	
Section II.E – Synthetic Minor	Not Applicable: The facility has not requested synthetic minor limits.	
Standard No. 1	Not Applicable: The landfill gas-fired combustion engines are not defined as fuel burning sources in the standard.	
Standard No. 3 (state only)	Emission Unit ID	Applicability Determination
	ICE-1, ICE-2	In accordance with Section I(J)(2), the combustion engines are exempt from the standard as the engines utilize a renewable energy resource burned for energy recovery. An exemption was granted in Construction Permit CA based on information submitted by the facility, received November 19, 2009.
	FLR-1	The mini flare is considered an industrial incinerator under this standard. In accordance with Section III (I)(1), the mini flare is subject to the visible emissions limit of 20% opacity and the PM emission limit of 0.5 lb PM/MMBtu total heat input. Consistent with decisions at other landfill gas to energy facilities, the Department waives the waste analysis and PM source testing based on knowledge of the waste stream (Sections V(G) & VIII(A)) and operator training requirements based on the simple flare process (Section IX(D)).
Standard No. 4	Applicable: In accordance with Section IX (B), the combustion engines are subject to the visible emissions limit of 20% opacity. The engines are not subject to the particulate matter emission limits as the definition of process weight rate specifically excludes liquids and gases used solely as fuels. The flare is not subject to the particulate matter and visible emissions limits as it does not meet the definition of a process industry.	
Standard No. 5	Not Applicable: This facility was not in existence in 1979/1980 and does not operate any of the regulated processes.	
Standard No. 5.2	Emission Unit ID	Applicability Determination
		In accordance with Section I (A)(1), the combustion engines are subject to the standard as they were installed after June 25, 2004. In accordance with Table 1, the combustion



**STATEMENT OF BASIS**  
**Page 5 of 7**  
 BAQ Air Permitting Division

<b>Company Name:</b> Santee Cooper Berkeley County Landfill Gas to Energy Facility	<b>Permit Writer:</b> Kathleen Haddock, PE
<b>Permit Number:</b> TV-0420-0112	<b>Date:</b> DRAFT

**Table 2: REGULATORY APPLICABILITY REVIEW**

Regulations	Comments/Periodic Monitoring Requirements		
	ICE-1, ICE-2	engines must meet a limit of 1.25 gm/bhp-hr for NO <sub>x</sub> . In accordance with Section IV (B)(3), the combustion engines are subject to the tune-up requirements of the standard.	
	FLR-1	In accordance with Section I(B)(5), the mini flare is not subject to the standard.	
Standard No. 7	Not Applicable: The facility does not have the PTE to emit 250 TPY of any subject pollutant.		
61-62.6	Applicable: The facility is subject to the state-wide requirements for fugitive particulate matter emissions as stated in condition M.4 in the General Facility Wide section of the permit.		
40 CFR 60 and 61-62.60	Subpart	Emission Unit ID	Applicability Determination
	Subparts A – General Provisions and JJJJ – Stationary Spark Ignition Internal Combustion Engines	ICE-1, ICE-2	In accordance with §60.4230, the landfill gas-fired combustion engines are subject to the subpart. The manufacture dates of the engines are October 30, 2007 and May 5, 2008. The facility has certified compliance with the subpart requirements. See Table 3 for Subpart JJJJ applicability.
40 CFR 61 and 61-62.61	Not Applicable: The facility does not operate any of the regulated processes.		
40 CFR 63 and 61-62.63	Subpart	Emission Unit ID	Applicability Determination
	Subparts A – General Provisions and ZZZZ –Stationary Reciprocating Internal Combustion Engines	ICE-1, ICE-2	In accordance with §63.6585 (a) and (c), the combustion engines are subject to the area source requirements of the MACT. In accordance with §63.6590(c), the facility can meet the requirements of the MACT by demonstrating compliance with 40 CFR 60, Subpart JJJJ.
61-62.68	Not Applicable: The facility does not store or use any regulated chemicals above threshold limits.		
40 CFR 64 (CAM)	Not Applicable: The facility does not operate any control devices. The mini flare is not considered a control device. It is used with a gas pre-treatment system to combust methane gas used to regenerate the carbon filter on the system.		

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**Table 3: 40 CFR 60 – Subpart JJJJ Applicability**

Reg. Citation	Subpart Language													
§60.4230 (a)	<p>The provisions of this subpart are applicable to manufacturers, owners, and operators of stationary spark ignition (SI) internal combustion engines (ICE) as specified in paragraphs (a)(1) through (6) of this section. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator.</p> <p>Based on information provided in the construction permit application, ICE-1 was manufactured on October 30, 2007 and ICE-2 was manufactured on May 5, 2008.</p>													
§60.4230(a)(4)(i)	<p>Owners or operator of stationary SI ICE that commence construction after June 12, 2006, where the stationary SI ICE are manufactured on or after July 1, 2007, for engines with a maximum engine power greater than or equal to 500 hp [...].</p> <p>The engines are each rated at 2,233 hp.</p>													
§60.4233(e)	<p>Owners or operators of stationary SI ICE with a maximum engine power greater than or equal to 75 kW (100 hp) [...] must comply with the emission standards in Table 1 of this subpart for their stationary SI ICE.</p> <p>From Table 1:</p> <table><tr><th rowspan="2">Max Engine Power</th><th rowspan="2">Manufacture Date</th><th colspan="3">Emission Standards (g/hp-hr)</th></tr><tr><th>NO<sub>x</sub></th><th>CO</th><th>VOC</th></tr><tr><td>≥ 500 hp</td><td>7/2/2007</td><td>3.0</td><td>5.0</td><td>1.0</td></tr></table> <p>VOC Emissions do not include formaldehyde.</p>	Max Engine Power	Manufacture Date	Emission Standards (g/hp-hr)			NO <sub>x</sub>	CO	VOC	≥ 500 hp	7/2/2007	3.0	5.0	1.0
Max Engine Power	Manufacture Date			Emission Standards (g/hp-hr)										
		NO <sub>x</sub>	CO	VOC										
≥ 500 hp	7/2/2007	3.0	5.0	1.0										
§60.4234	Owners or operators of stationary SI ICE must operate and maintain stationary SI ICE that achieve the emission standards as required in §60.4233 over the entire life of the engine.													
§60.4243	<p>(b) If you are an owner or operator of a stationary SI ICE and must comply with the emission standards specified in §60.4233 (e), you must demonstrate compliance with (b)(2).</p> <p>(b)(2) purchasing a non-certified engine and demonstrating compliance with the emissions standards specified in §60.4233(e) and according to the requirements specified in §60.4244, as applicable, and according to paragraphs (b)(2)(ii).</p> <p>(b)(2)(ii) you must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emission. In addition, you must conduct an initial performance test and conduct subsequent performance testing every 8,760 hour or 3 years, whichever comes first, thereafter to demonstrate compliance.</p>													
§60.4244	Owners and operators of stationary SI ICE who conduct performance tests must follow the procedures in paragraphs (a) through (f) of this section. (Note: (a) through (f) reference §60.8 and Table 2 of the subpart, specify general testing requirements, and give equations to determine compliance with NO <sub>x</sub> , CO, and VOC limits.) Paragraph (g) gives options for VOC testing.													



**STATEMENT OF BASIS**  
**Page 7 of 7**  
BAQ Air Permitting Division

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<b>Permit Number:</b> TV-0420-0112	<b>Date:</b> <b>DRAFT</b>

\$60.4245

Notification, Reporting, and Recordkeeping for Owners and Operators, as applicable. Includes maintenance records and performance test results.

**Table 4: AMBIENT AIR STANDARDS REVIEW**

Regulations	Comments/Periodic Monitoring Requirements
Standard No. 2	Applicable: There have been no changes at the facility since the previous modeling was submitted. See modeling summary dated December 6, 2009.
Standard No. 7.c	
Standard No. 8 (state only)	

**PUBLIC NOTICE**

This Title V Permit will undergo a 30-day public notice period and a 45-day EPA comment period in accordance with SC Regulation 61-62.1, Section II.N and SC Regulation 61-62.70.7(h). The comment period was open from June 21, 2018 to July 20, 2018 and was placed on the BAQ website during that time period.

**SUMMARY AND CONCLUSIONS**

It has been determined that this source, if operated in accordance with the submitted application, will meet all applicable requirements and emission standards.